11 Roads and Traffic

11.1 Introduction

This chapter of the Environmental Impact Statement deals with the impact of the proposed development on roads and traffic in the area of the proposed development predicts the relevant impacts arising from the proposed development and, where considered appropriate, mitigation measures have been specified. It is divided into the following sub-sections;

11.1 Introduction

11.2 Methodology

- *Scoping Report*
- *Traffic Impact Assessment*
- *Road Safety Audit*
- *Road Pavement Analysis*

11.3 Receiving Environment

- *Site Location*
- *Site Description*
- *Adjacent Developments*
- *Local Road Network*
- *Public Transport Facilities*
- *Bord Na Móna Contributions for the Upkeep of the R400*

11.4 Baseline Traffic Conditions

- *Analysis of the Existing Operation and Capacity of the Junctions*

11.5 Traffic Impact Assessment

- *Predicted Trip Generation during the Construction Phase of the Proposed Development*
- *Construction Phase Trip Distribution*
- *Predicted Trip Generation during the Construction Phase of the Proposed Development*
- *Operational Phase Trip Distribution*
- *Assessment Years*
- *Highway Capacity Impacts*
- *Pavement Integrity Impact*
- *Road Safety Audit*

11.6 Traffic Mitigation

- *Trip Generation*
- *Road Safety Audit*
- *Parking Provision*

- *Road Pavement Analysis*
- *Operational Phase Trip Distribution*
- *Assessment Years*

11.7 Residual Impacts

11.2 Methodology

11.2.1 Scoping Report

Prior to undertaking a Traffic Impact Assessment (TIA), a traffic scoping document was sent to both Offaly County Council and the National Roads Authorities Regional Design Office in Mullingar, Co. Westmeath, hereafter referred to as NRARDOW. The traffic scoping document summarised the existing traffic situation in the vicinity of the proposed development and outlined the type and scale of development proposed. The document detailed the relevant issues relating to traffic arising from the proposed development and summarised how the TIA would be undertaken. The traffic scoping document is contained within Appendix 7A *Traffic Scoping Document*

Both Offaly County Council and NRARDOW were invited to provide comments or recommendations on the traffic scoping document and suggest further information, if any, which would be required in the compilation of a complete Traffic and Transport Assessment for the development. In response to the invitation to provide comments on the scoping report the following issues were raised by Offaly County Council and NRARDOW.

(i) Offaly County Council

Offaly County Council stated that they were in agreement with the methodology and aims as set out in the traffic scoping document. However they requested that traffic counts be conducted on a Friday as the greatest traffic volumes in the area are generally experienced on a Friday.

(ii) NRARDOW

NRARDOW also stated that they were generally in agreement with the methodology and aims as set out in the scoping document. However they also raised the following issues:

- The structural strength of the R400 regional road would be under strain due to the peaty nature of the underlying soils. It was considered that due to the scale of the proposed development, there could potentially be a negative impact on the road. They recommended that proposals for strengthening of the road should be assessed. An element of post-construction maintenance should also be considered.

- It was mentioned that vulnerable road users are not anticipated in the area, however it was recommended that the applicant should initiate discussions with the NRA - Design Office to confirm facilities for vulnerable road users at the two intersections within the Co. Westmeath area, especially the R446/R400 staggered junction.

- Description of the haulage routes is important, especially if local primary/secondary roads are to be used. This was considered necessary to ensure that passing facilities are adequate and that the safety of local residents is not compromised.

- As the proposed development will require vehicular access via the Regional Road, Westmeath County Council requested that a Road Safety Audit be carried out.

The methodology adopted for assessing the traffic impact arising from the proposed development was outlined in the above mentioned traffic scoping document and was further modified based on the responses received from the scoping exercise. In order to assess the traffic impact arising from the proposed development, during both the construction phase and the operational phase, a number of assessments were undertaken as detailed here:

- Traffic Impact Assessment (TIA);

- Road Safety Audit;

- Road Pavement Analysis.

11.2.2 Traffic Impact Assessment

The traffic impact assessment has been prepared in accordance with the *Traffic and Transport Assessments Guidelines*, (NRA, 2007). This traffic and transport assessment was carried out to assess the existing traffic and transport conditions in the area, and to assess the impact that traffic generated by the proposed development would likely have on the road network local to the proposed development.

The expected year of completion for the proposed development will be 2014. In accordance with the "*Traffic and Transport Assessments Guidelines*", a traffic analysis is required to be undertaken for the year of opening of the development, 2014, and plus fifteen years from this date, namely year 2029. Further to this, it is also necessary to undertake an assessment of traffic in the locality under the existing conditions, for the current year (2008) and during the construction phase for the project, with peak construction expected during 2011. Therefore, junction capacity analyses have been conducted for four distinct years as follows:

- **2008**: The present year, to assess whether junctions are currently operating within capacity, as a base for future traffic growth.

- **2011:** This is likely to be the year in which the greatest volumes of traffic generated by the construction of the proposed development will occur - See further details in Section 11.5.

- **2014**: The expected year of opening of the development.

- **2029**: Fifteen years from the expected year of opening.

(i) Traffic Counts

The capacity and operation of a road network is dependant on the junctions within that network and it is the capacity and operation of these junctions that determines the capacity and vehicle delay on the network. In order to obtain traffic volumes representative of those generally experienced in the vicinity of the proposed development, turning movement counts were conducted at a number of key junctions in the vicinity of the development See Figure 11.1 *Traffic Count Locations*. The junctions at which turning movement counts were to be undertaken were agreed with both Offaly County Council and NRARDOW**.** As requested by Offaly County Council traffic counts were conducted on a Friday on the 25th of June 2008 over a twelve hour period from 07:00 to 19.00. Counts were conducted prior to the closure of local primary schools for summer holidays and therefore no drop in normal traffic volumes was likely at this date. The junctions which were assessed are as follows:

- Junction 1 - The junction of the R400 and the R441 at Rhode;
- Junction 2 - The existing entrances to the development site;
- Junctions 3A & 3B - Elements of the interchange between the R400 and the M6; and
- Junction 4 - The junction of the R400 and the R446 at Rochfortbridge.

Note: Junction 4: the junction of the R400 and the R446 (previously the N6) in Rochfortbridge consists of two junctions in close the proximity to each other. These junctions are namely:

- A mini roundabout at the R400's southern junction with the R446, and
- A priority T-junction at the R400's northern junction with the R446.

For modelling purposes these junctions had to be analysed as two separate junctions. The mini roundabout being given the label Junction 4B, and the priority junction being given the label Junction 4A.

11.2.3 Road Safety Audit

Also arising from the consultation with NRARDOW, it was decided that a Road Safety Audit (RSA) should be carried out. The RSA was conducted in August 2008 with a final report being delivered in September 2008. The full contents of the RSA are included in Appendix 7B *Road Safety Audit Report* of this EIS.

11.2.4 Road Pavement Analysis.

Arising from the consultation with NRARDOW it was decided that, given the level of HGV traffic likely to be generated by the development during the construction phase, it would be prudent to assess the structural strength of the existing R400.

Given that all HGVs accessing the site will be directed to use the section of the R400 between the development site entrance and the newly constructed interchange with the M6, it was agreed that only this section of pavement would be analysed. The full Road Pavement Analysis report is included in Appendix *7C Pavement Analysis Report* of this EIS.

In order to assess the existing structural condition and the residual life of the section of the R400, the following tests were undertaken:

- The Falling Weight Deflectometer Test
- A Dynamic Cone Pentrometer Testing Programme

The Falling Weight Deflectometer works on the same principle as all deflection devices; a load of known magnitude is imparted to the pavement, and the resulting deflections of the pavement are measured. For this project, interest centred on deflections under typical HGV wheel loads of 40 kN. Additionally, a coring and dynamic cone pentrometer (DCP) testing programme was carried out by PMS Ltd. to determine the as-constructed thicknesses of the existing pavement layers.

In order to facilitate the preparation of a Road Pavement Analysis, estimated levels of HGV traffic likely to be generated by the proposed development during both its construction and operational phases were determined, as detailed in Table 11.1 *HGV Movements Associated with the Various Construction Phases* . and Table 11.2 *HGV Movements Associated with the Operational Phase of the Development During Typical Operations*.

Table 11.1 HGV Movements Associated with the Various Construction Phases

Construction Traffic Requirements			
Construction Phases	**Proposed Duration (Months)**	**Dates**	**Average No. of HGV Movements Associated with Phase (HGVs / day)**
Site Clearance	4	Sept 2010 to Dec 2010	32
Civil Works	10	Jan 2011 to Oct 2011	40
Plant Installation	10	Nov 2011 to Aug 2012	6
Mechanical and Electrical Works	10	Sep 2012 to June 2013	4
Testing and Commissioning	4	Jul 2013 to Oct 2013	1

The estimated HGV traffic levels used for the pavement analysis are significantly lower than those used in the Traffic Impact Assessment (TIA). This is because the TIA uses a worst case scenario which uses assumptions of peak traffic flow, whereas the HGV levels used for the pavement analysis are based on average traffic levels.

Table 11.2: HGV Movements Associated with the Operational Phase of the Development during Typical Operations

Post-Construction Traffic Requirements	
Estimated Daily HGV Traffic for the Plant under Normal Operation	**Design Period**
3	20 years

Testing was undertaken on a section of the R400 road between the proposed development site and the start of the recently upgraded M6 motorway scheme, in November of 2008. The full text of this report is contained in *Appendix* 7C *Pavement Analysis Report* of this EIS.

11.3 Receiving Environment

11.3.1 Site Location

The proposed power plant development is located in the northeast of County Offaly. The site is bisected by the R400 Regional Road and is approximately 4 km from Rochfortbridge and 6 km from Rhode. This places it in close proximity to the border with County Westmeath.

11.3.2 Site Description

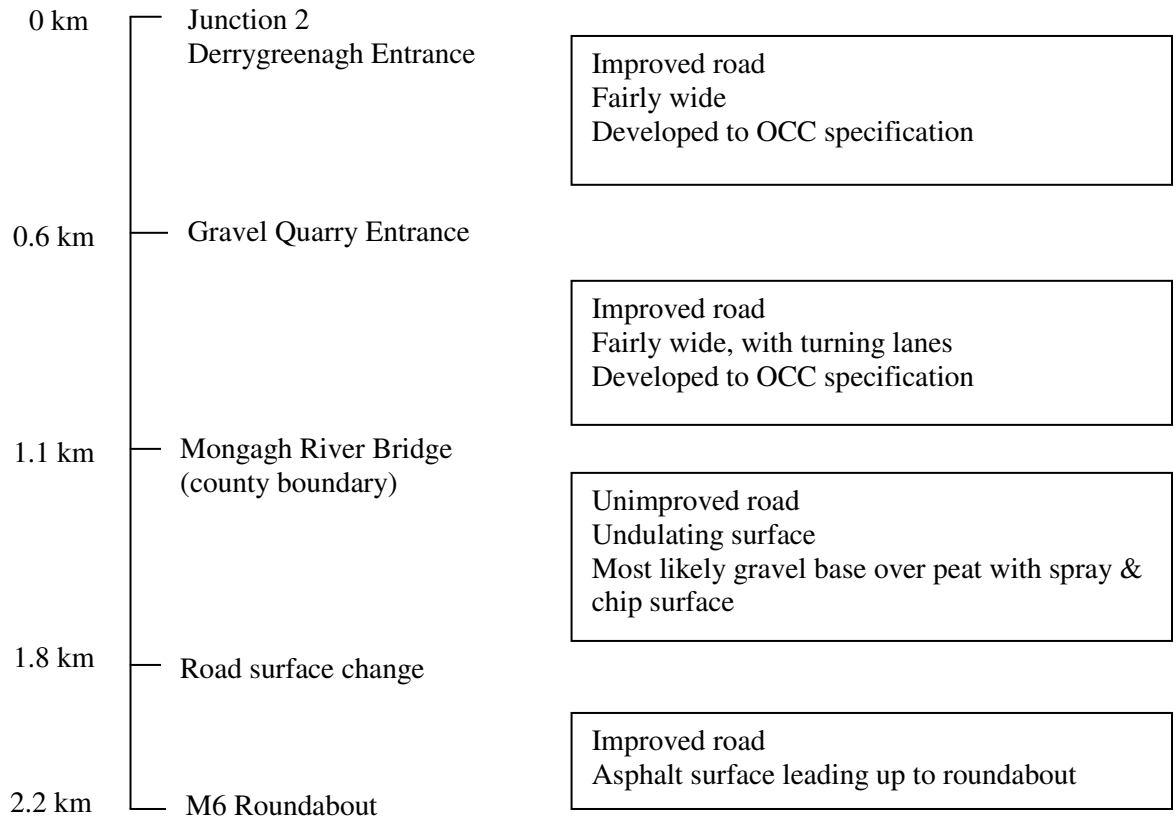
The existing site is comprised of a Bord na Móna works which includes a workshop complex, stores and office facilities. A number of Bord na Móna railway tracks also traverse the site. The site is used for a range of activities that support peat production, and also accommodates the Head Office of Bord Na Móna Energy. The principal activities carried out on the site are the servicing and maintenance of peat production and transport equipment. Adjacent land uses include two exhausted cut-away bogs at Drumman and Derryarkin, which lie to the east and west of the site respectively. There is an existing sand and gravel quarry approximately 1.0 km to the west of the site. The property, wholly owned by Bord na Móna, is accessed via the regional road (R400). Site accesses are provided in the form of two staggered priority T-junctions with the R400. The main development is to be constructed to the north of the existing R400 with a high voltage switchyard to be constructed to the south of the R400. Approximately 2.2 km to the north west of the site, there is a grade separated interchange between the R400 and the M6 motorway.

11.3.3 Adjacent Developments

There is an existing sand and gravel quarry approximately 1.0 km to the west of the site; and a second quarry approximately 2.0 km north east of the site. Both of these quarries are under the ownership of a joint venture company formed between Bord na Móna and Cement Roadstone Holdings. A third sand and gravel quarry, which is privately owned, is located approx. 2 km south west of the site.

11.3.4 Local Road Network

As stated previously, the site is located on the R400 between Rhode and Rochfortbridge, with a grade separated interchange between the M6 and the R400 located approximately 2.2 km to the north west of the site. From Rhode to the development site entrance at Derrygreenagh, the R400 is rural in character with average widths of approximately 6 m. From the Derrygreenagh site entrance to the M6 junction the R400 exhibits three different pavement surfaces and cross sections as outlined below:



- The first section (total 1.1km) was improved by BnM/Roadstone to an Offaly County Council specification prior to the opening of the gravel quarry.
- The second section (0.7 km) is unimproved over peat.
- The final section (0.4 km) has an improved surface and leads into the M6 junction.

The M6 from Kinnegad to Athlone, which intersects the R400 in the form of a grade separated interchange, comprises 57.5 km of motorway from the existing Athlone Relief Road to the M4 at Kinnegad. The Kinnegad to Kilbeggan section of the M6 consists of 28 km of motorway, 18 principal structures and 3 grade separated junctions. The section from Kinnegad to Tyrellespass was officially opened on 5th December 2006, and the remainder was officially opened on 16th May, 2007.

11.3.5 Public Transport Facilities

There are no public transport services in operation to the site.

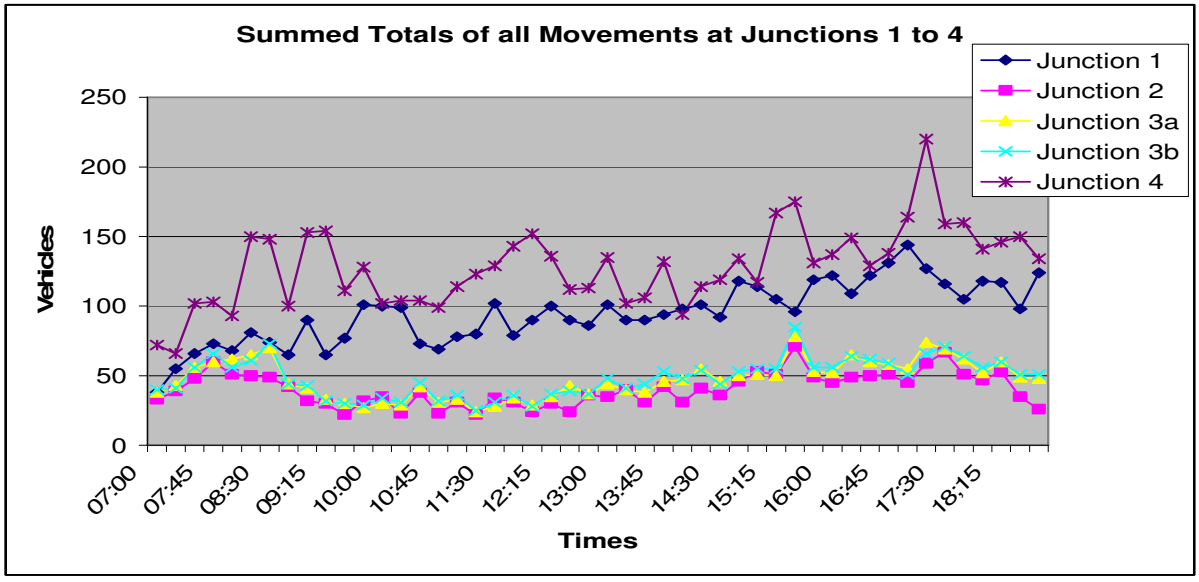
11.3.6 Bord na Móna Contributions for the upkeep of R400

Annual payments of €10,000 per annum, indexed from 2002, are made by Bord na Móna/Roadstone to Offaly Co. Co. in respect of upkeep and maintenance of the R400 (Planning Ref. PL2/01/356, Condition 18). These payments are scheduled to continue until 2026, the anticipated date of cessation of gravel extraction activities at the nearby quarry. Annual payments of IR£5,485 (€6,974 – indexed from 2002) are also made to Westmeath Co. Co. for road maintenance and upkeep of the section of the R400 not upgraded as part of the M6 scheme (Planning Ref. 01/444, Condition 22).

11.4 Baseline Traffic Conditions

Analysis of the traffic counts revealed the a.m. system peak to be between 07:45 and 08:45 and the p.m. system peak to be between 17:00 and 18:00. See Figure 11.2 *Summed Totals of all Movements at Junctions 1 to 4* below. Figure 11.3 *Am Peak Hour Traffic Flows and Figure 11.4 Pm Peak Hour Traffic Flows,* detail the recorded turning movements at each of the junctions for the morning and evening peak respectively.

Figure 11.2: Summed Totals of all Movements at Junctions 1 to 4



It can be established from the turning movement surveys that the maximum peak network flow occurs during the p.m. peak hour, with an accumulative throughput of 1,929 vehicles at the junctions surveyed. The throughput of vehicles during the a.m. peak hour was recorded at 1,472 vehicles, approximately 24% lower than the p.m. peak.

Figure 11.3: AM Peak Hour Traffic Flows

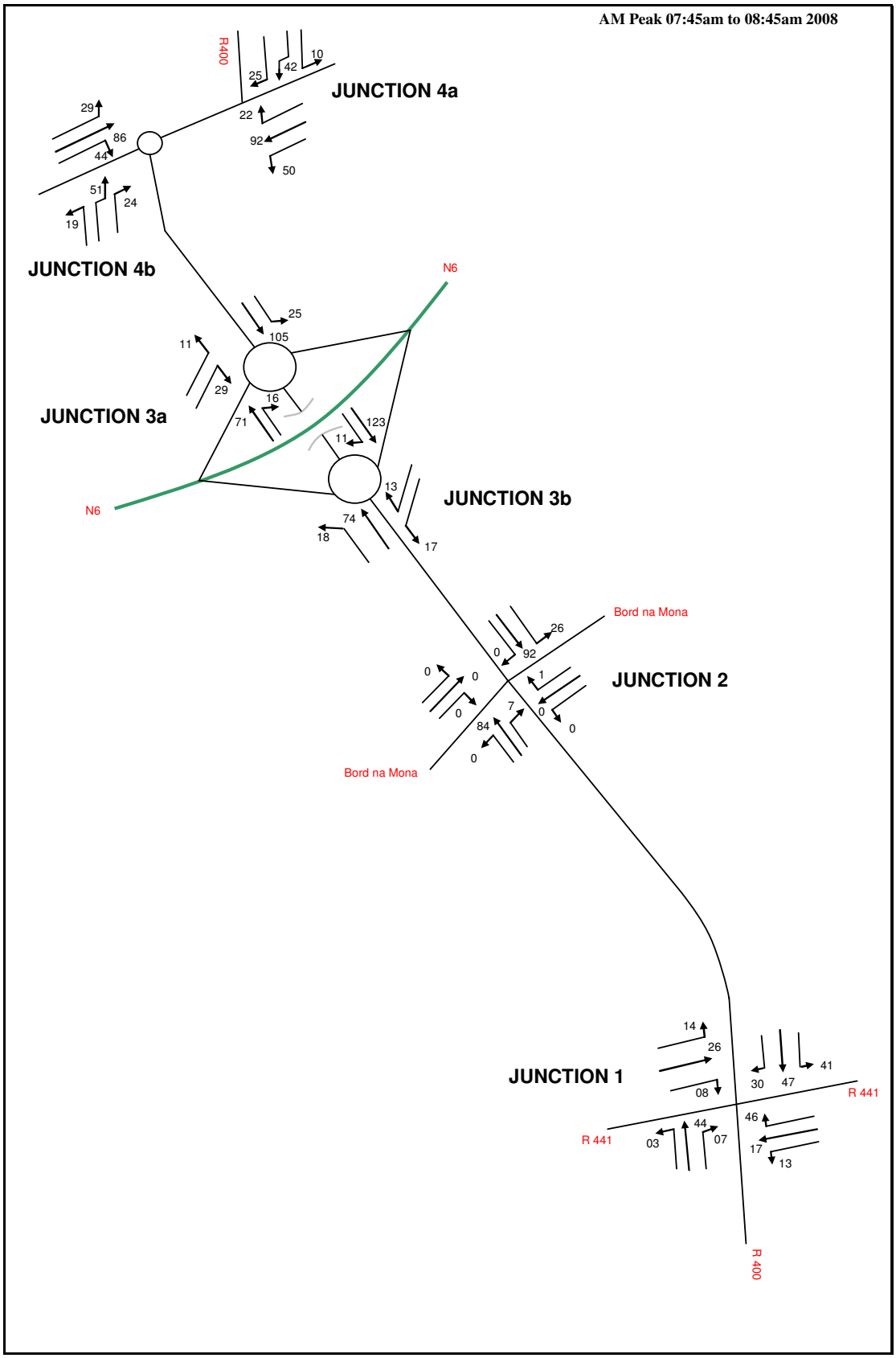
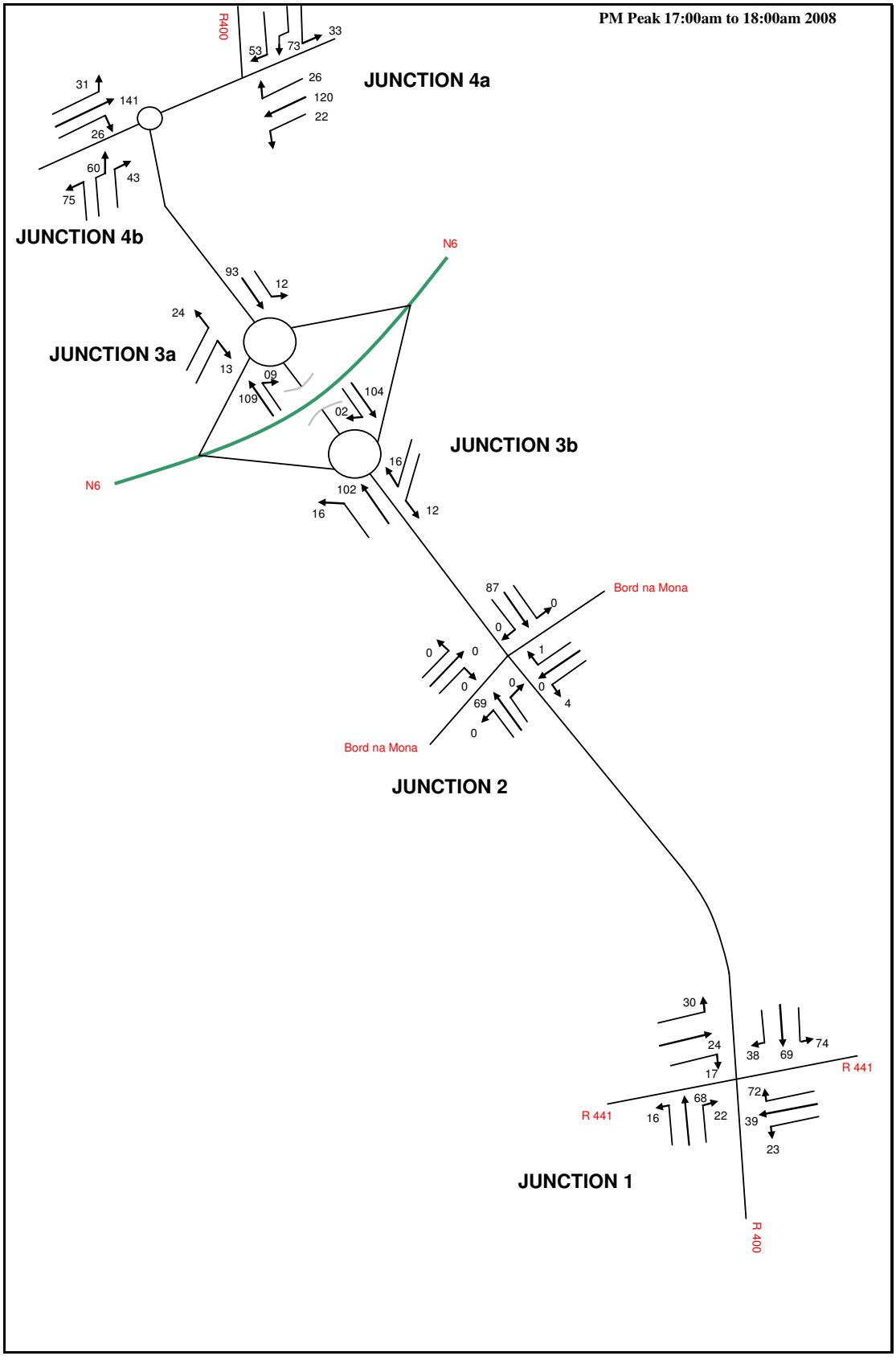


Figure 11.4: PM Peak Hour Traffic Flows



11.4.1 Analysis of the Existing Operation and Capacity of the Junctions

Having established the link flows and turning movements on the local road network in the vicinity of the development site, an analysis of the operation and capacity of the junctions surveyed was conducted. The analysis was conducted using the computer modelling programmes PICADY and ARCADY as produced by the Transport Research Laboratory (TRL) in the UK. These programmes are used to predict capacities, queue lengths and delays at priority junctions and non-signalised roundabouts respectively.

Both PICADY and ARCADY output files contain tables consisting of demand flows, capacities, queues and delays for each 15 minute time segment of the peak hour analysis. These tables contain start and finish times and, for each arm of the junction, traffic demand, capacity, Ratio of Flow to Capacity (RFC), start queue length, end of queue length and queuing delay. The RFC provides the basis for judging the acceptability of junction designs and the capacity of existing junctions. Briefly an RFC of 85% or less is considered to be acceptable during the peak period. An RFC of this value would indicate that at peak times the junction is at 85% of its operational capacity and thus have a reserve capacity of 15%. This level of reserve capacity is considered by traffic engineers to be the level of reserve capacity generally required at a junction to cater for periods of unusually high traffic flows, such as bank holiday weekends. A summary of the PICADY and ARCADY results for the existing surveyed junctions is given in the Table 11.3 *Summary of PICADY and ARCADY Modelling of Junctions*. As can be seen from the table, all junctions on the road network are currently operating well within capacity. A copy of the full PICADY and ARCADY output files for the existing AM and PM peak hours are included in the Appendix 7D *PICADY and ARCADY Files* to this report.

Table 11.3: Summary of PICADY and ARCADY Modelling of Junctions

2008 Base Year			
Junction No.	**AM RFC Max**	**PM RFC Max**	**Acceptable RFC**
1	12.4 %	20.9 %	*85%*
2	15.9 %	25.1 %	*85%*
3A	8.4 %	8.0 %	*85%*
3B	10.5 %	8.8 %	*85%*
4A	23.6 %	40.7 %	*85%*
4B	34.2 %	46 %	*85%*

11.5 Traffic Impact Assessment

11.5.1 Predicted Trip Generation during the Construction Phase of the Proposed Development

The construction phase for the proposed power plant development is likely to extend over a thirty eight month period. During this period there will be five distinct phases of work as follows:

- Phase 1: Site clearance: 4 months (September 2010 – December 2010)
- Phase 2: Civil works period: 10 months (January 2011 – October 2011)
- Phase 3: Plant Installation: 10 months (November 2011 – August 2012)
- Phase 4: Mechanical and electrical works: 10 months (September 2012 – June 2013)
- Phase 5: Testing and commissioning: 4 months (July 2013 – October 2013)

Phase 2, the civil works period, will likely generate the highest volumes of traffic during the construction phase. During this phase the peak labour force requirement on site is likely to be approximately 450 construction workers. However, in order to adopt a conservative approach, we have allowed for up to 600 construction workers in the traffic model. HGV movements to and from the site will be approximately 40 HGV movements to and from the site over the course of the working day. Again such deliveries would be dispersed over a typical working day of 07:00 AM to 19:00 PM.

Given the remote and rural location of the site it is assumed that all construction workers will travel to the site by means of private car. However an element of car pooling will likely come into operation and, taking this factor into account, it has been conservatively assumed that the occupancy of vehicles travelling to the site will be 1.25 persons per vehicle. This would yield 480 private cars travelling to and from the site each day over the course of a ten month period. It is assumed that all construction workers travelling to and from the site will do so during the a.m. peak hour and the p.m. peak hour as a worst case scenario. In reality the average working day extends from 7:00 to 19:00, and as a result the vast majority of traffic will arrive and depart outside the am and pm peak hours. Table 11.4 *Maximum Construction Phase Arrivals and Departures during Peak Hours* outlines the maximum predicted trip generation by the power plant development during its construction phase.

Table 11.4: Maximum Construction Phase Arrivals and Departures During Peak Hours

	AM Peak Hour 07:45 to 08:45		**PM Peak Hour 17:00 to 18:00**	
	Arrivals	Departures	Arrivals	Departures
Staff Movements	480	0	0	480
HGV Movements	4	4	4	4
Totals	**484**	**4**	**4**	**484**

From the above table it can seen that the maximum predicted number of arrivals to, and departures from, the site during its operational phase, are 484 arrivals and 4 departures during the a.m. peak hour, and vice versa during the p.m. peak hour. Staffing and HGV delivery requirements during Phases 1, 3 and 4 of construction will be significantly lower than those required during construction phase 2.

11.5.2 Construction Phase Trip Distribution

The distribution of trips by construction workers to the site was based on the following factors:

- Size of the main towns in the area, including Mullingar, Kinnegad, Tullamore, Portarlington and Edenderry;
- Their location relative to the development site; and
- The accessibility of the site via the M6 and M4 motorways.

On the basis of these factors, the following distribution of trips by construction workers to the site is considered most likely:

- 40% of workers will commute from Mullingar, with half of this forty per cent using the R400 and half using the M4 and M6 to access the site;
- 25% of workers will commute from Tullamore, with all of this twenty five per cent using the N52 and M6 to access the site;
- 15% of workers will commute from Edenderry, with all of this fifteen per cent using the R441 and R400 to access the site;
- 10% of workers will commute from Portarlington, with all of this ten per cent using the R400 to access the site;
- 7.5% of workers will commute from Kinnegad and other locations accessible to the M4, with all of this seven and a half per cent using the M4 and M6 to access the site; and
- The remaining 2.5% of workers will use the R446 through Rochfortbridge and the R400 to access the site.

Table 11.5 *Expected Routes used by Construction Workers* outlines the likely trip distribution and expected routes to be used by construction workers accessing the site.

Table 11.5: Expected Routes Used by Construction Workers

Trip Distribution: Percentage of Workers from Each Location	No. of Worker vehicles from each location	Expected Route
40% from Mullingar	192	96 from the R400 & 96 from the M4/M6
25% from Tullamore	120	120 from the N52 and the M6
15% from Edenderry	72	72 from the R441
10% from Portarlington	48	48 from the R400
7.5% from Kinnegad and other locations accessible to the N4	36	36 from the M4 & M6
2.5% from the old N6 through Rochfortbridge	12	12 from the R446 (old N6) through Rochfortbridge
Total	480	

In relation to HGV trip distribution all deliveries to the site will be directed to approach the site along the R400 from the direction of the junction with the M6. Therefore 100% of HGV trips are expected approach the site from the direction of the motorway. This may include HGV traffic from the nearby sand and gravel quarries to the north of the site. The following Table 11.6 *HGV Deliveries and Routes During Peak Hours* outlines the likely trip distribution and expected routes to be used by HGV delivery vehicles accessing the site.

Table 11.6: HGV Deliveries and Routes During Peak Hours

Trip Distribution: Percentage of HGV's from Each Location	No. of HGV's from each location in the AM & PM Peak Hours	Expected Route
100% from the M6 direction	4	The M4 & M6 Motorway(s), the R446 (old N6) and the R400

11.5.3 Predicted Trip Generation during the Operational Phase of the Proposed Development

Traffic relating to the development in its operational phase will consist of three main categories as follows:

- Operational & Maintenance staff and Bord Na Móna Powergen office staff movements on and off site;
- General deliveries to the site, such as water treatment consumables and maintenance materials and spares; and
- Distillate oil deliveries to the storage facilities on site.

Operational and Maintenance staff requirements for the proposed development once it is in its operational phase (from 2012 onwards) would be quite modest. The staffing numbers would consist of:

- 18 shift workers with 6 shifts of 3 workers per shift with 3 arriving onsite and 3 departing at each change of shift ;
- 15 station day staff; and
- 25 - 30 BnM Powergen staff

Assuming a worst case scenario, all power station day workers and Powergen staff, would use their own private cars and would arrive at the plant during the morning peak hour, and 3 shift workers would arrive and a further 3 would depart during the same hour, and vice versa during the evening peak hour. This scenario would equate to a maximum of (30 + 15 + 3 = 48) vehicular arrivals at the site and 3 vehicular departures from the site during the morning peak hour. In the evening peak hour this scenario would see 48 vehicular departures at the site and 3 vehicular arrivals at the site.

General deliveries, such as water treatment consumables, maintenance materials and spares, to the plant would again be of a low order of magnitude with typical general deliveries to the site being approximately 5 vehicles per day. These deliveries would be dispersed over a 12 hour period, assuming a typical working day of 07:00 a.m. to 19:00 p.m., and will include both HGVs and light

vans. This would equate to 0.4 vehicle arrivals to and departures from the site during the a.m. and p.m. peak hours. For the purposes of producing a robust assessment of likely departures and arrivals to the site, we will assume 1 vehicle arrival and 1 vehicle departure from the site during the a.m. and p.m. peak hours.

The third and final source of trip generation to and from the site would be the delivery of distillate to the storage facilities on site. Three different scenarios were considered here to determine the maximum traffic levels generated arising from the transport of distillate to the power plant as detailed below:

- Scenario 1: Typical operation of the OCGT unit;
- Scenario 2: peak for OCGT unit plus CCGT unit under test;
- Scenario 3: emergency running of both units.

Under Scenario 1, typical operation, it is estimated that the OCGT unit operates for ~ 10 hours per week on average. Distillate consumption for this scenario is an estimated 482 m^3 per week. This will require 16 deliveries per week, or 2 to 3 deliveries per day.

Scenario 2 is modelled to estimate the maximum distillate consumption, on a weekly basis, over the course of a year;

- For the OCGT unit the peak annual weekly hours of operation is estimated at 46 hours per week, based on historical data on similar plants;
- Distillate consumption for the CCGT unit relates to testing of the fuel changeover systems, and is estimated at 8 hours and is required to be carried out twice per year.

The number of deliveries of distillate to the site required to replace the distillate consumed in Scenario 2, within a period of one week, is estimated to be 14 deliveries per day. Table 11.7 *Estimation of peak traffic associated with distillate deliveries in Scenario 2,* briefly outlines how this delivery figure was derived.

Table 11.7: Estimation of peak traffic associated with distillate deliveries in Scenario 2

	OCGT	CCGT	
Plant Details			
Maximum continuous rating	170	430	MW
Full load efficiency (LHV)	33%	55%	
Fuel consumption*	48.2	73.1	m^3/hr
* For distillate with average calorific value 38.5 GJ/m^3 (LHV)			
Max usage - Normal operations			
Hours per week	46	8	hrs
Fuel consumption	2216	585	m^3/week
Total		2801	m^3/week
No of deliveries @30m^3/delivery		94	deliveries per week
Deliveries per day		14	deliveries per day

The maximum traffic volumes associated with deliveries of distillate to the site arise under Scenario 3. This scenario is based on the need to replenish the minimum threshold stocks on the site after an activation of the use of the emergency distillate reserve by Eirgrid. This would only occur if there had been a major interruption in the supply of natural gas through the interconnector pipelines from the UK, and gas supply to the power stations had been curtailed. The worst case for traffic has been estimated on the basis of having to replace the entire minimum reserve levels in a two week period. The calculations of traffic volumes arising from such a scenario are shown in Table 11.8 *Estimation of Peak Traffic Associated with Replacement of Emergency Distillate Reserve* below.

Table 11.8: Estimation of peak traffic associated with replacement of emergency distillate reserve

Max Usage - emergency operations			
	OCGT	**CCGT**	
Hours of operation on liquid fuel	72	120	hrs
Output on reserve fuel	100%	90%	
Fuel consumed	3468	7895	m^3
Total		11364	m^3
No of deliveries @30m^3/delivery		379	deliveries
Replenishment period		2	weeks
		190	deliveries per week
Deliveries per day		28	deliveries per day

In this case, up to 190 deliveries per week, equating to approx 28 per day, would be required under this scenario. It should be stated that this estimate is very conservative, as it is unlikely that the entire reserve of both the CCGT unit and the OCGT unit would be consumed before corrective action on the gas supply could be implemented. It is also likely that deliveries would be made during the period that the emergency generation on secondary fuel was in force. It therefore sets an extreme case for the number of distillate deliveries that would be required at the site, estimated to occur once in the lifetime of the proposed development. Again such deliveries would be dispersed over a 10 hour period, assuming a typical working day of 07:00 a.m. to 19:00 p.m. This would result in 2.8 HGV arrivals at and departures from the site during the a.m. and p.m. peak hours. For the purposes of producing a robust assessment of likely departures and arrivals to the site, 3 HGV arrivals and 3 HGV departures from the site during the a.m. and p.m. peak hours will be assumed.

To produce the most robust assessment of the trip generation arising from the power plant in its operational phase, the worst case scenario for all categories of trip generation has been assumed. Table 11.9 *Worst Case Operational Phase Arrivals and Departures at Peak Hours* outlines the worst case scenarios for trip generation to and from the power plant in its operational phase.

Table 11.9: Worst Case Operational Phase Arrivals and Departures at Peak Hours

	AM Peak Hour 07:45 to 08:45		**PM Peak Hour 17:00 to 18:00**	
	Arrivals	Departures	Arrivals	Departures
Staff Movements	48	3	3	48
General Deliveries	1	1	1	1
Distillate Oil Deliveries	3	3	3	3
Totals	**52**	**7**	**7**	**52**

From the above table it can be seen that the maximum predicted number of arrivals to and departures from the site during its operational phase are 52 arrivals and 7 departures during the a.m. peak hour and vice versa during the p.m. peak hour. No change in either staffing levels or delivery requirements to the power plant is predicted over the course of its life cycle.

11.5.4 Operational Phase Trip Distribution

This phase refers to the completed project operating as predicted, post construction, i.e. from 2014. It is anticipated that trip distribution of the staff working at the facility once it is in its operational phase will follow a similar distribution pattern to that predicted for construction workers during the plant's construction phase. The probable trip distribution pattern is outlined graphically in Appendix 7E *Traffic Routing Drawing* of this report.

11.5.5 Assessment Years

The Base Year for the development is the anticipated year of completion and this is expected to be 2014. In accordance with the "*Traffic and Transport Assessments Guidelines*", it is a requirement to undertake a traffic analysis for the Base Year, 2014, and fifteen years from this date, the Design Year, 2029. Additionally analysis for 2011, the expected year of maximum construction traffic, has been conducted.

The traffic growth from within the development will be expected to remain stagnant over the period 2014 to 2029, assuming no new developments take place within the site, and employment levels and delivery levels are assumed to remain constant.

The National Roads Authority (NRA) 2003 publication "Future Traffic Forecasts 2002 to 2040" was used to calculate growth factors for the road network traffic. Table 11.10 *Traffic Growth Factors* outlines the calculated growth factors to convert from 2008 to 2011, 2014 and 2029.

Table 11.10: Traffic Growth Factors

	2008	2011	2014	2029	Growth Factor (2008 to 2010)	Growth Factor (2008 to 2014)	Growth Factor (2008 to 2029)
10 % HGV	117	126	132	163	1.08	1.12	1.39
90 % Car / LGV	119	127	133	157	1.07	1.12	1.32
Overall Growth Factor					**1.075**	**1.12**	**1.36**

The effects of the net traffic growth on the existing network plus the additional traffic generated by the proposed development over an above current levels of traffic generated from the current operations at the site have been compiled to build PICADY and ARCADY traffic models to assess junction operation and capacity in the future years 2011, 2014 and 2029. This incorporates the net additional traffic generated from the development, above that currently arising from activities on the site, with the projected traffic on the road network for the same year.

11.5.6 Highway Capacity Impacts

Junction capacity analyses have been conducted as outlined in previous sections at the following junctions:

- Junction 1 - The junction of the R400 and the R441 at Rhode
- Junction 2 - The existing entrances to the development site
- Junctions 3A & 3B - Elements of the interchange between the R400 and the M6
- Junctions 4A & 4B - The junctions of the R400 and the R446 at Rochfortbridge

Capacity analysis is being carried out for the future years 2011, 2014 and 2029. The RFC values obtained for each junction during the a.m. and p.m. peak periods are outlined in Table 11.11 *Junction Capacity in 2011*, Table 11.12 *Junction Capacity in 2014* and Table 11.13 Junction *Capacity in 2029* below.

Table 11.11: Junction Capacity in 2011

2011:Peak Construction Year			
Junction No.	**AM RFC Max**	**PM RFC Max**	**Acceptable RFC**
1	23.8	50.8	85
2	59.7	68.5	85
3A	22.2	25.8	85
3B	27.7	12.5	85
4A	26.6	65.0	85
4B	65.7	58.5	85

Table 11.12: Junction Capacity in 2014

2014 Proposed Opening Year			
Junction No.	**AM RFC Max**	**PM RFC Max**	**Acceptable RFC**
1	15.0 %	27.1 %	85
2	13.9 %	20.7 %	85
3A	10.8 %	11.0 %	85
3B	14.1 %	12.5 %	85
4A	26.7 %	46.8 %	85
4B	41.3 %	53.0 %	85

Table 11.13: Junction Capacity in 2029

2029 Fifteen Years from Year of Opening			
Junction No.	**AM RFC Max**	**PM RFC Max**	**Acceptable RFC**
1	17.5	34.0	85
2	15.8	23.2	85
3A	13.0	13.0	85
3B	16.7	14.8	85
4A	33.0	59.3	0.85
4B	50.4	67.3	0.85

As can be seen from the above tables all junctions operate within capacity during the construction year, 2011 and future year 2014 and 2029.

11.5.7 Pavement Integrity Impact

In order to assess the maintenance / upgrading on the R400, required to maintain its structural integrity over a twenty year design period, an estimate of cumulative HGV traffic was required. This involved estimating the HGV movements associated with both the construction and operational phases of the proposed development, as detailed in Table 11.1 *HGV Movements Associated with the Various Construction Phases* and Table 11.2 *Movements Associated with the Operational Phase of the Development under Typical Operations.* It also used the percentage HGV content on the R400, of the existing Annual Average Daily Traffic (AADT) levels. It was determined that the existing R400 road was in good condition with good structural integrity due to ongoing upgrading of the roadway. However, due to the significant HGV traffic to be generated during the construction phase, the R400 road would require further upgrade from the site to R400 / M6 junction, to achieve a residual life of twenty years. The required upgrades are detailed in Section 11.7 *Traffic Mitigation*

11.5.8 Road Safety Audit (RSA)

It should be noted that many of the issues raised as part of the RSA are normally not considered until the detailed design stage of the project. However, it is considered appropriate in this instance that the issues be considered in full here. A number of potential safety hazards were identified in the RSA. The full contents of the RSA are included in Appendix 7B *Road Safety Audit Report* of this EIS. The issues raised can be classified as internal to the development site and external, relating to the R400 regional road.

(i) Internal

- Pedestrian Crossing Points: A lack of suitable pedestrian crossing points within the development site was noted.
- Traffic Signs and Road Markings: Suitable road markings and traffic signage had not been indicated at junctions within the development.
- Street Lighting: Street Lighting had not been indicated within the development.
- Potholes at Access Junctions: A number of potholes were noted on the access road to the development site at its junction with the R400.
- Staff car park: Inadequate turning facilities and aisle widths had been provided within the proposed staff car park.
- Turning Facilities at Switchyard: No turning head had been provided for HGVs within the proposed switchyard.
- Drainage Details: Drainage details for surface water drainage had not been provided throughout the scheme.

(ii) External

- Street Lighting at the entrance to the development: No street lighting had been indicated at the entrance to the development.
- Provision of Ghost Islands: It was suggested in the RSA that 'ghost islands' should be provided at the entrance to the development.
- Ponding at various locations along the R400:
- Narrow Road Widths (approx 5.0m) at locations along the R400: It was noted that at a number of locations along the R400 between the entrance to the development and Rhode that road widths were quite narrow.
- Areas in need of surface maintenance

11.6 Traffic Mitigation

11.6.1 Trip Generation

This chapter identified the existing, 2008, base traffic conditions at four critical junctions in the vicinity of the proposed development site at Derrygreenagh Co. Offaly. The impact of the proposed development has been assessed using three scenarios, namely the peak construction year 2011, the expected year of opening 2014, and fifteen years from the year of opening, 2029. The analyses undertaken indicate that, even with the addition of the development generated traffic, the local road network operates well within its optimum design capacity. The site will be accessed from the R400 by means of a simple priority junction, although temporary road widening and ghost islands will be implemented during the construction phase of the development.

It is not considered that the impact of the proposed development, throughout both the construction and operational phases, will extensively inhibit either through traffic or local traffic, from a capacity point of view.

11.6.2 Road Safety Audit

Notwithstanding the fact that the proposed development project is currently at preliminary design stage, a number of issues, which would normally be considered at a more advanced detailed design stage, have been identified within the RSA. As a result of this, the following steps have been taken to ensure that the issues are effectively addressed. This will ensure the health and safety of all in relation to risks posed arising from traffic generated by the proposed development:

(i) Internal Layout

The internal layout of the proposed development site has been modified to reflect any issues specified as part of the RSA assessment. In relation to the issues raised by the RSA the following actions are proposed:

- Pedestrian desire lines have been identified, and suitable road markings in accordance with the requirements of the *Traffic Signs Manual,* will be provided at such pedestrian crossing points.
- Suitable road markings and signage in accordance with the requirements of the Traffic Signs Manual will be provided.
- Street lighting is to be provided throughout the site.
- The access road to the development is to be re-surfaced as part of the construction programme.
- The staff car park has been re-designed. A suitable car park with 2.4m x 4.8m parking spaces and 6m aisles has been designed.
- A new turning head which can cater for the turning circle of a large articulated HGV has been designed and incorporated at the end of the access road to the switch yard.
- Surface water drainage has been designed and incorporated into the Site Layout Plan.

(ii) External Hazards

A number of issues have been raised in the RSA which are external to the development site. Whilst every effort has been made to take these issues into consideration in the design of the development, they remain outside the control of Bord na Móna. In relation to the issues raised by the RSA the following actions have been recommended:

- Street Lighting is to be provided at the entrance to the development.
- Provision of Ghost Islands at the entrance to the Development
    - The current two-way AADT (Annual Average Daily Traffic) on the R400 at the entrance to the development is 2,448 vehicles. Using the growth factors outlined

earlier in this report, we calculate that by the opening year (2014) this existing traffic will have increased to 2,742 vehicles and to 3,330 by the future year (2029).

- The total traffic generated by the development will be of the order of 1,040 journeys per day during the construction Phase and 104 journeys per day during the operational Phase.

- An assessment of the junction on the R400 for access to the site, specifies that a simple T-junction would be satisfactory in the opening year (2014) and the future year (2029), in terms of the safe carrying capacity of the junction, taking full account of adequate site lines. It is not required to provide a right turning lane or other measures to accommodate traffic at the junction for either of these years. During the construction phase of the development, however, provision of ghost islands will be required, due to the significant levels of construction phase traffic accessing the site.

- It is proposed that temporary road widening measures will be provided at the entrance to the proposed development during the construction phase of the project and that post construction the road will be re-instated to its original alignment at the entrance to the development

- The "ponding" issues noted at various locations along the R400 are outside the control of Bord na Móna, as are the requirements for road surface maintenance. As noted earlier, Bord na Móna currently makes development contributions totalling €17k annually, to Westmeath and Offaly county councils, for road maintenance of the R400. Details of how to progress with these matters will be determined in consultation with the relevant local authorities.

- It was noted that at various locations on the R400, narrow road widths of approximately 5m exist, and that two HGVs would be unable to pass each other at such locations. All such locations are found on the R400 between the proposed development site entrance and Rhode village. As a result of this finding, and following consultation with Offaly county council, it was decided that all HGVs accessing the site, during the construction phase, will be directed to approach the site using the R400, from the direction of the newly constructed M6 motorway. Therefore, no HGV traffic will be allowed access the proposed development site from the R400 via the village of Rhode. Road widths in excess of 6m are in existence along the entire section of the R400 between the site and the M6 junction.

11.6.3 Parking Provisions

All car park requirements will be contained within the development site and will cater for the predicted 48 arrivals and departures per day along with additional visitor spaces. During the construction phase of the development, car parking for construction workers will be provided on hard standing areas within the confines of the site.

11.6.4 Road Pavement Analysis

The results of the pavement analysis indicated that, to achieve a residual life of twenty years on the section of the R400 on which the proposed development will generate traffic, strengthening works will be required. The suggested strengthening works consist of 80 mm of hot-mix overlay on a 500 m section of the R400, from the entrance to the development travelling north towards the newly constructed interchange with the M6, and a 50 mm hot-mix overlay on a 1,300 m section immediately north of the said 500 m section.

Implementation of such strengthening works would result in a twenty year residual pavement life for ***all traffic*** using this section of the R400. The proposed development would constitute 40% of HGV movements on this section of the R400 during its construction phase, and less than 2% of HGV traffic during its operational phase. The implementation of the road strengthening works identified in the Road Pavement Analysis will be determined with the relevant local authorities in advance of the commencement of the proposed development

11.7 Residual Impacts

The mitigation strategies detailed above recommend actions which will be taken to reduce or offset the scale, significance and duration of the impacts on the local road network in terms of traffic generation, safety and pavement integrity. It is anticipated that with the implementation of these mitigation measures, neither the construction nor operational phases of the development will impact significantly on the roads and traffic in the local area.